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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/664,842

Applicant(s)

KALAGNANM ET AL.

Examiner

MARK A. FLEISCHER

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Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 15-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)
- Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status of Claims

1. This non – final Office Action is in reply to the Request for Continued Examination and amendments filed on 30 April 2009.
2. Claims 1, 3 – 6, 11 – 13, 15 and 20 have been amended.
3. Claim 14 has been cancelled.
4. Claims 1–13 and 15–20 are currently pending and have been examined.

Continued Examination Under 37 CFR 1.114

5. A request for continued examination under 37 CFR §1.114, including the fee set forth in 37 CFR §1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR §1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR §1.114. Applicant's submission filed on 30 April 2009 has been entered.

Response to Amendment

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action.
7. The rejection of claim 5 under 35 U.S.C. §112, 2nd paragraph is withdrawn in light of Applicant's arguments.

Response to Arguments

8. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection. In an effort to elucidate the applicability of the selected prior art, the Examiner has provided the following remarks regarding Applicant's arguments.
9. Applicant essentially argues that none of Ahmed, Bichler nor Santos specifically teach "whether to accept an order based on uncertain future demand" (Remarks, p.11) or more generally contemplate the circumstances of what a decision maker should do in the situation of when

"demand exceeds supply" (Remarks, p.10) and variously argue the distinctions between "strategic" and "tactical" decision making (Remarks, p.10). Examiner has supplied new art (Tezuka; see also Tanaka) that teaches this particular situation.

10. Insofar as Applicant's arguments with regard to reliance on Ahmed and Bichler, Applicant argues that neither Ahmed nor Bicher teach or suggest "tactical level decision making" and that a distinguishing feature of the invention is the capability to make tactical decisions, as opposed to strategic decisions. Applicant further provides the example of what they mean by a "tactical decision": a "recommendation for whether to accept an order for at least one of the multiple products at a time when demand exceeds a planned sales volume" (Remarks, p.12). Examiner respectfully disagrees with Applicant and notes that Santos specifically addresses this issue. Santos, in [0078-80] specifically refers to "make and sell decisions" based on accounting for "demand uncertainty". This aspect is specifically addressed below in the claim rejections.

Claim Objections

11. Claims 1, 15 and 20 are objected to because of the following informalities: the claims contain the limitation *determining an indicator based on the generated sales plan to accept an order for a given product of the multiple products upon determining that the demand exceeds the allocation for the given product at a price class in at least one of the multiple time periods*. Examiner has discovered only three instances in the Specification of where the word "indicator" or "indication" is used. The specification p.7, lines 9 – 11 states "The trigger engine senses the demand scenario that is being realized in a given time period. It provides an indication of when a seller may need to reoptimize the sales plan based on current realization.", and thus the 'indication' is on whether to reoptimize the sales plan whereas the limitation appears to mean the indicator provides a signal to a decision maker 'to accept an order' and therefore is inconsistent with the manner in which the term indicator is used in the specification. Moreover, the other two instances in the specification refer to "economic indicators" and this further makes the claim language confusing. Examiner suggests that a modification to the language such as "on the generated sales plan *on whether* to

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accept an order..." would make the language clearer if this is consistent with its intended meaning. Appropriate action is required.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1–3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmed, et al. (*Multi-Stage Stochastic Integer Programming Approach for Capacity Expansion under Uncertainty*) in view of Bichler, et al. (*Applications of Flexible Pricing in Business-to-Business Electronic Commerce*) and further in view of Tezuka, et al. (US PgPub 20030167146 A1).

Claims 1, 15 and 20:

Note that although the wording and structure of claims 1, 15 and 20 are slightly different, they have the same scope and so are addressed together. Ahmed, as shown, describes and /or discloses the following limitations.

- *A method for developing an optimal sales plan for multiple products with multiple price classes* (Ahmed, in at least page 7, lines 2 and 3 describes math-programming formulations involving "multiple demand families" and "multiple product families") *a contingent on different possible realizations of uncertain demand over multiple time periods* (Ahmed, in at least page 4, line 16 refers to "Multi-stage models extend two-stage stochastic programming models by allowing revised decisions in each time stage based upon the uncertainty realized so far." (emphasis added) and in the abstract therein "Using a scenario tree approach to model the evolution of uncertain demand [...] we develop a multi-stage stochastic integer programming formulation for the problem." (emphasis added) where the realized 'uncertainty'

associated with 'uncertain demand' corresponds to *realization of uncertain demand* and the 'multi-stage' stochastic program corresponds to *multiple time periods*.) for *maximizing revenue over a constrained capacity, comprising:*

- *determining an allocation of each of the multiple products across the multiple price classes to be sold in each of the multiple time periods* (Ahmed page 4 describes "capacity planning" which corresponds to *determining an allocation*, and on page 7, "multiple demand families" and "multiple product families"),
- *generating a sales plan based on the likelihood and the realized order data at each of the multiple price classes and for each of the multiple products within a current time period upon determining that the demand for the at least one of the multiple time periods exceeds the allocation for the given product at the price class* (Ahmed, page 5 states "To extend the formulation (CAP) to a stochastic setting, we assume that the uncertain problem parameters (α_t , β_t , d_t) evolve as discrete time stochastic processes with a finite probability space and generate a filtration." Ahmed, on page 4, line 3 states: "With the advent of stochastic programming and increased computational power, the use of scenarios to model uncertainties in planning models has become increasingly popular." (emphasis added) where the 'increased computational power' refers to *executing [a] stochastic program* on a computer. Further down on that page, Ahmed specifically refers to "Multi-stage models" that incorporate uncertainty to produce a plan.).
- *estimating a likelihood that the demand for each of the multiple products exceeds the allocation at the price class for each of the multiple time periods* (see Ahmed p. 7 regarding multiple demand and product families.)

Ahmed does not specifically address the notion of *maximizing expected revenue*, or that *generates a quantity* but Bichler, as shown does. Bichler, in at least page 290, column 1 at the bottom, refers to "Revenue management originated [...] as the practice of controlling the

availability and/or pricing of travel seats in different booking classes, with the objective of maximizing revenue and/or profits." (emphasis added) and later, on page 296, column 2, last paragraph, refers to the notion of expected values: "Bid pricing [...] seeks a price that maximizes expected profit [...]" (emphasis added) where 'maximizes expected profit' is analogous to *maximizing expected revenue*.

On page 290, column 2, Bichler refers to *multiple products* for which a 'quantity' is recommended: "In general, it is possible to increase revenue by optimal allocation of the total quantity across multiple price classes." (emphasis added) and later on page 298, column 1 states "The [] process is complex since it involves multiple products [...] sold [...] characterized by different demands across the different products." (emphasis added) where 'optimal allocation' corresponds to *generates a quantity*. In addition, Bichler on page 291, column 1 at the bottom refers to "supply shortages", and thus corresponds to the situation where *realized demand ... exceeds [] planned sales volume*. Finally, Bichler refers to the notion of generating a sales recommendation over different time periods, to wit "[A] manufacturer needs to be able to generate an accurate ATP (available to promise) profile. Companies also need to be able to make real-time projections of the cost of providing these bundles." (emphasis added) and "In commodity spot markets, supply shortages are known to cause wild price fluctuations." where 'generate' also corresponds to *generates a quantity* and 'real-time projections' corresponds to a *recommendation* and 'supply shortages' corresponds to the situation where *realized demand ... exceeds [] planned sales volume*. Bichler further describes and/or discloses the following limitations.

- *estimating a likelihood that the demand for each of the multiple products exceeds the allocation at the price class for each of the multiple time periods* (Bichler, on page 299, column 2 states: "In the e-utility, dynamic pricing will probably apply when the estimated loads are much higher than predicted. [...] The owner may wish to contract for a short-term "assured" burst to cover the requirements of the premium users. [...] It may be possible for the service provider to estimate the

frequency of such bursts, [...]." (emphasis added) where the phrase 'higher than predicted' corresponds to *planned sales volume* and a 'burst' is the occurrence of demand exceeding predicted amounts, e.g., sales volume exceeding demand, and 'estimate the frequency of' these 'bursts' corresponds to *estimating a likelihood* per the limitation. Finally, such demand bursts must *ipso facto* occur at some time period. Bichler on page 299, column 2 specifically refers to "fairly long time intervals". See also Bichler, p.289, col. 2 "Assuming demand exceeds supply..." See also Ahmed, p.7 regarding multiple demand and product families.);

- collecting realized order data for the multiple products at each of the multiple price classes and for each of the multiple time periods (Bichler, on page 298 in the figure illustrates a "Data Warehouse" and a set of "historical transactions" corresponding to the limitation. See also Ahmed, p.7 regarding multiple demand and product families.)

Note that Ahmed specifically refers to multi-stage stochastic programming models while Bichler, more generally, refers to a variety of decision problems where uncertainty is present. Such problems are ubiquitous and can involve many types of objective functions including, but not limited to, minimizing cost or maximizing expected revenue where the decision variables correspond to a 'plan' as indicated by both Ahmed and Bichler (both papers describe the output of the application of optimization techniques in terms of a 'plan'). Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the techniques and problem approaches described in Bichler with the multi-stage stochastic programming approach described in Ahmed and instead of applying it to capacity planning problems in the face of uncertain demand, it is applied to product sales planning problems in the face of uncertainty because this would utilize the benefits and power of the stochastic programming methodology to the case of multi-item, multi-stage sales planning problems.

Neither Ahmed nor Bichler specifically teach the following limitations, but Tezuka, in an analogous art does as shown:

- *determining an indicator based on the generated sales plan to accept an order for a given product of the multiple products upon determining that the demand exceeds the allocation for the given product at a price class in at least one of the multiple time periods* (Tezuka [0034] states "[...] an example of initial inventory information which indicates the number of each type of products in stock at the beginning of each period. [] shows an example of opportunity loss calculation coefficient information which indicates a loss produced by losing a sales opportunity because demand exceeds the volume of production. This coefficient is set in consideration of various situations." (emphasis added), and
- *a trigger engine determining that a demand scenario is realized for a given time period and providing an indication of when to re-determine the sales plan upon determining that the demand scenario for the given time period exceeds the planned sales volume wherein the sales plan is used by the tactical decision model for generating the indicator and for determining a supply of the multiple products in the multiple price classes.* (Tezuka [0034] states "... which indicates the number of each type of products in stock at the beginning of each period... an example of opportunity loss calculation coefficient information which indicates a loss produced by losing a sales opportunity because demand exceeds the volume of production. This coefficient is set in consideration of various situations." (emphasis added) where the reference indicates a given time period and the term 'indicates' corresponds to *providing an indication* and where 'various situations' corresponds to *the demand scenario for the given time period* and 'demand exceeds...' corresponds to the demand exceeding the *planned sales volume* as claimed.)

Ahmed and Bichler teach systems and methods for establishing inventory control policies

and application of multi-stage stochastic programming methods to optimize sales planning decision-making. Tezuka additionally teaches methods for making recommendations as to make or sell decisions, equivalent to making a recommendation for accepting an order, in a situation with uncertain further demand. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine and improve upon the features of Ahmed/Bichler by incorporating those of Tezuka because provides methods and means for developing solutions to the "product mix problem" (Tezuka [0004]) and that the capability existed at the time of the invention and the resulting improvements would have been predictable.

Claim 2:

Ahmed does not specifically disclose and/or describe the following limitation, but Bichler, as shown does.

- *collecting realized order data comprises continuously collecting new realized order data* (Bichler refers to 'continuous' data collection on page 289, column 1-2: "Flexible pricing requires tight integration between the buy and sell sides, with the capability of real-time updates to key operational data flows." (emphasis added) where 'sell side[]' corresponds to *demand*, 'real-time updates' and 'operational data flows' together corresponds to *continuously collecting realized order data*.) *and using the likelihood and the new realized order data to generate a revised sales plan* (Bichler states on page 292, column 1, "If there is demand in excess of planned supply, [...] a manufacturer that has real-time coordination capability with its suppliers can [...] plan the desired configuration, [...] and finally generate an asking price 'on the fly.'" (emphasis added) where the 'demand in excess' corresponds to *the likelihood* and 'plan the desired configuration' corresponds to a *sales plan* and 'generate ...' corresponds to *using the likelihood to generate a price*, hence a plan including price and quantity.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the techniques and problem approaches described in Bichler with the multi-stage stochastic programming approach described in Ahmed and instead of applying it to capacity planning problems in the face of uncertain demand, it is applied to product sales planning problems in the face of uncertainty that entails continuous monitoring of order data because this would utilize the benefits and power of the stochastic programming methodology to the case of multi-item, multi-stage sales planning problems and incorporate the capabilities of real-time data updates and processing thereby enabling a more efficient sales management system.

Claim 3:

Bichler further discloses the following limitation, *formulating a multistage stochastic program comprises formulating the multistage stochastic program using IBM QSL Stochastic Extensions* (Bichler on page 295, column 1 states: "In general, [...] the amount to be procured from each supplier is a difficult optimization problem that is modeled as an integer program and solved using a commercial solver like IBM's Optimization Solutions Library (OSL)," (emphasis added).)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify the teachings of Ahmed/Bichler and incorporate the application of software that solves the aforementioned types of problems because the availability of many software options allows facilitates the solutions of the types of problems the instant Application addresses.

14. Claims 4 – 13 and 15 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmed, et al. (*A Multi-Stage Stochastic Integer Programming Approach for Capacity Expansion under Uncertainty*) in view of Bichler, et al. (*Applications of Flexible Pricing in Business-to-Business Electronic Commerce*) in view of Santos, et al. (US PgPub 20020143665 A1).

Claim 4:

Ahmed/Bichler do not specifically disclose the following limitation, but Santos, as shown, does.

- *formulating a multistage stochastic program that generates a quantity of each product to be sold in each of the multiple time periods and a recommendation for pricing each*

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of the *multiple products* (Santos, in at least [0067], states: "The sell quantity [] indicates the recommended quantity of the product to be sold [...]" (emphasis added) where the system and method of Santos generates the 'recommended quantity' 'to be sold' as per the limitation. Santos, in at least claim 17 further describes "multiple products". Santos, in at least [0037] also describes how multiple period data are handled: "In one embodiment, the EOL engine [] is a single period engine. Thus multiple period records defined in FORECAST.TXT are rolled into single period records for FORECAST.EOL." (emphasis added) where 'multiple period' corresponds to *multiple time periods*.)

Ahmed/Bichler further discloses and/or describes the following elements of the limitation. Ahmed, in the abstract, specifically refers to *multi-periods*. Bichler, on page 298, column 2, states: "[T]he output of the optimization engine is a set of [...] recommended prices (or reserve prices for auctions) for each channel, [...]" (emphasis added) where the 'output' corresponds to that which the *stochastic program...generates* and 'recommended prices' corresponds to a *recommendation for pricing* in the limitation. Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed/Bichler with that of Santos because this would allow the stochastic programming methodology of Ahmed/Bichler to be applied to a class of problems involving the sale of multiple products over multiple time periods and thereby enlarge the scope and applicability of stochastic programming methodology, and solve a larger class of decision problems.

Claim 5:

Ahmed/Bichler further disclose and/or describe the following limitation.

- *estimating the likelihood comprises determining a demand forecast and comparing the demand forecast and the planned sales volume* (Bichler, on page 292, column 1 states: "If there is demand in excess of planned supply, [...]" (emphasis added) where the 'demand in excess...' corresponds to the comparison between 'demand' and another quantity. Bichler also states that "In typical supply-chain management,

demand is [assumed] to be an external variable that needs to be forecasted." (emphasis added) hence refers to a *forecast of ... demand*. Bichler refers to sales volume: "The transaction volume is large and the suppliers provide volume discounts [...]" (emphasis added) where 'transaction volume' corresponds to a *sales volume*. Bichler does not specifically refer to *planned sales volume*, but does refer to *planned supply* as noted earlier.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed with that of Bichler because this would allow the stochastic programming methodology of Ahmed to be applied to a class of problems involving the *sale* of multiple products over multiple time periods as opposed to inventory management and capacity expansion and thereby enlarge the scope and applicability of stochastic programming methodology, and solve a larger class of decision problems.

Claim 6:

Ahmed does not specifically disclose the following limitation, but Bichler and Santos, as shown, do.

- *further comprises executing a multistage stochastic program using the likelihood to generate a sales plan for pricing each of the multiple products* (See the rejection of claim 4 where 'recommended prices' corresponds to a *sales plan* and that this applies to "multiple products" as per Santo claim 17. Bichler states on page 292, column 1, "If there is demand in excess of planned supply, [...] a manufacturer that has real-time coordination capability with its suppliers can [...] plan the desired configuration, [...] and finally generate an asking price 'on the fly.'" (emphasis added) where the 'demand in excess' corresponds to *the likelihood* and 'plan the desired configuration' corresponds to a *sales plan* and 'generate ...' corresponds to *using the likelihood to generate a price*, hence a plan including price and quantity.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed/Bichler with that of Santos because this would allow

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the stochastic programming methodology of Ahmed/Bichler to be applied to a class of problems involving the sale of multiple products over multiple time periods and thereby enlarge the scope and applicability of stochastic programming methodology, and solve a larger class of decision problems.

Claim 7:

Ahmed does not specifically disclose and/or describe the following limitation, but Bichler, as shown does.

- *collecting realized order data comprises collecting realized order data from an Internet website* (Bichler, on at least page 289, column 2 states: "The final sell-side channel shown in Figure 1, direct Web-site sales, is basic to business-to-consumer (B2C) models." (emphasis added) wherein 'direct Web-site sales' corresponds to *collecting ... order data* since such web-based interfaces provide a mechanism for placing, hence collecting, orders.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed and Bichler because using modern internet technologies for gathering orders is an efficient and cost-effective means of doing business and facilitates the collection of order data, hence allows the methods of Ahmed to provide more accurate and timely data with which to generate forecasts and execute the aforementioned stochastic programming methodology.

Claim 8:

Ahmed/Bichler do not specifically disclose *collecting realized order data comprises collecting realized order data from a point-of-sale terminal*. However, the Examiner takes **as admitted prior art** that it is old and well known in the e-commerce arts to utilize any number of order entry devices such as point-of-sale terminals. Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed and Bichler because using modern internet technologies and other electronic communication systems for gathering orders is an efficient and cost-effective means of doing business and facilitates the

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collection of order data, hence allows the methods of Ahmed to provide more accurate and timely data with which to generate forecasts and execute the aforementioned stochastic programming methodology.

Claim 9:

Ahmed does not specifically disclose and/or describe the following limitation, but Bichler, as shown does.

- *collecting realized order data comprises collecting realized order data from a reverse auction* (Bichler, on page 289, column 2 states: "Therefore, many companies may have to implement a hybrid procurement strategy [...] for some portion of the anticipated demand, and use reverse auctions [...]" (emphasis added) where 'anticipated demand' corresponds to *collecting realized order data* and 'use reverse auction' corresponds to order data *from a reverse auction*. Note, the action of *procuring* must *ipso facto* involve creating sales demand for sellers, hence provide for *collecting [] order data*. Bichler further refers to data collection on page 289, column 1-2: "Flexible pricing requires tight integration between the buy and sell sides, with the capability of real-time updates to key operational data flows." (emphasis added) where 'sell side[]' corresponds to *demand*, 'real-time updates' and 'operational data flows' together corresponds to *collecting realized order data*.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed and Bichler because using modern procurement channels for gathering orders is an efficient and cost-effective means of doing business and facilitates the collection of order data, hence allows the methods of Ahmed to provide more accurate and timely data with which to generate forecasts and execute the aforementioned stochastic programming methodology.

Claim 10:

Ahmed/Bichler do not specifically disclose and/or describe the following limitation, but Examiner takes as **admitted prior art** as disclosed and/or described below.

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- *keeping a counter of the quantity of realized order data being collected* (Examiner takes as **admitted prior art** that it is old and well-known as well as commonplace in the software arts to track or monitor the number of specified events, items, or pieces of data that are computed, stored and/or collected.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the quantity of invention to combine the teachings of Ahmed and Bichler and utilize standard software programming techniques to track certain values, such as the *quantity of realized order data* because the collection of order data, and its quantities and associated values enables the methods of Ahmed and Bichler and thereby provide more accurate and timely data with which to generate forecasts and execute the aforementioned stochastic programming methodology.

Claim 11:

Ahmed/Bichler do not specifically disclose the following limitation, but Santos, as shown, does.

- *comprising calculating a confidence level representing a probability that the realized order data will be outside the range of a confidence interval* (Santos, in at least [0080] states: "For example, mean, standard deviation, and covariance of the demands can be estimated from the sales history of the same or related products." (emphasis added) where the 'standard deviation' is a necessary component for computing a confidence level and as this is estimated 'from the sales history' it corresponds to a standard deviation of the value disclosed in claim 10, the realized order quantity. Furthermore, Santos specifically notes use of a confidence level in [0082]: "Optimization of the selected business objective using the selected combinations of demand levels and associated probabilities will produce a result including an optimal raw material buy plan associated with a confidence level." (emphasis added) where the 'demand levels' leads to a 'confidence level').

Neither Ahmed, Bichler nor Santos specifically state that the confidence level *represents a probability that the realized order data will be outside the range of a confidence interval*, but Examiner takes as **admitted prior art** that it is old and well-known as well as common place

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inventory control and statistical analysis arts that a 'confidence level' represents the probability that a random variable lies outside a range specified by the associated confidence interval. Therefore, it would have been obvious to one with ordinary skill in the art at the time of the quantity of invention to combine the teachings of Ahmed/Bichler with that of Santos and compute certain values, such as a *confidence level* because such values are essential elements of the aforementioned stochastic programming (SP) methodology, hence, enables the methods of Ahmed/Bichler and Santos thereby facilitates the application of the aforementioned stochastic programming methodology to the case of multi-item, multi-stage sales planning problems.

Claims 12 and 13:

Ahmed/Bichler/Santos do not specifically disclose and/or describe the following limitations, but Applicant's own admissions do (see also **admitted prior art** as shown below).

- *wherein the confidence level is calculated using a normal distribution program upon determining that the counter has a value above a threshold.*
- *the confidence level is calculated using a gamma distribution program upon determining that the counter has a value above a threshold..* (Applicant on page 15, line 22 states that "The value of a "large" realized order data counter may vary depending upon implementation, as is known to those skilled in the art." (emphasis added). Applicant further notes that when such data are large, application of the normal distribution is appropriate whereas if data is not large, application of the gamma distribution is appropriate. Examiner takes as **admitted prior art** that it is old and well-known as well as commonplace in the statistical arts to compute confidence intervals and levels using the aforementioned probability distribution functions for large and small sized data sets, respectively.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the quantity of invention to combine the teachings of Ahmed/Bichler with that of Santos and compute certain values, such as a *confidence level* using appropriate statistical methodology because such values are essential elements of the aforementioned stochastic programming (SP)

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methodology, hence, enables the methods of Ahmed/Bichler and Santos thereby facilitates the application of the aforementioned stochastic programming methodology to the case of multi-item, multi-stage sales planning problems.

Claim 16:

Ahmed/Bichler do not specifically disclose and/or describe the following limitation, but Examiner takes **as admitted prior art** as disclosed and/or described below.

- *the trigger engine comprises a set of decision variables* (Examiner takes **as admitted prior art** that it is old and well-known as well as commonplace in the mathematical programming arts to employ the use of *decision variables* in 'decision problems'. Applicant admits on page 7 line 19 that "a trigger engine is provided that forecasts if the demand for any price class is significantly different from the allocation." (emphasis added) where the 'forecast' is a prediction of a significant difference. Applicant further states on line 21 that the engine is "used to determine [...]", hence, involved in solving a decision problem and thereby use *decision variables*.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the techniques and problem approaches described in Bichler with the multi-stage stochastic programming approach described in Ahmed and incorporate some means for determining when a new plan must be computed. The stochastic programming techniques of Ahmed utilize recourse actions that can be applied depending on realized demand. Thus, use of decision variables to detect when significant differences arise in product sales planning problems enables the benefits and power of the stochastic programming methodology to the case of multi-item, multi-stage sales planning problems.

Claim 17:

Ahmed/Bichler do not specifically disclose and/or describe the following limitation, but Santos, in view of **admitted prior art**, as shown, does.

- *a variable indicating the planned sales volume of one of the multiple products in one of the multiple price classes* (Santos in at least [0055] states: "SellQty.sub.i is the

quantity of product i to be sold." (emphasis added) where the phrase 'to be sold' indicates a *planned sales volume*.);

- *a variable indicating the quantity of one of the multiple products in one of the multiple price classes manufactured in a current time period to be sold in a next time period* (Santos, in at least [0026] states: "Demand forecasting is performed before manufacturing a new product." (emphasis added) where the 'demand forecasting' quantity corresponds to the amount to be manufactured and since this is done 'before manufacturing' it *ipso facto* corresponds to the amount to be *manufactured in a current time period and to be sold in a next time period*. Moreover, as Santos notes in [0078], "Demand realization triggers final assembly and sales corresponding to the second stage make and sell decisions. This multi-stage approach reflects the reality that purchase decisions frequently must be made well in advance of realization of the demand." (emphasis added) where the 'second stage' specifically corresponds to a later time period.); *and*
- *a variable indicating the quantity of one of the multiple products in one of the multiple price classes manufactured in the current time period to be sold in the current time period* (Examiner notes that this limitation is met by the rejection of the first limitation in that, depending on how long a given time period is and how it is defined, the aforementioned 'forecast' quantity can denote the amount of manufactured items to be sold in the *current time period*. Moreover, Santos acknowledges that for some items, such as "[r]aw materials, for example, might take several weeks or months lead time for acquisition while assembly might take a few hours." (emphasis added) where 'a few hours' could correspond to the current time period and 'assembly' is a manufacturing process, hence yields a *quantity... manufactured in the current time period*.)

Examiner takes **as admitted prior art** that it is old and well-known as well as commonplace in the mathematical programming arts and specifically in the multi-stage stochastic programming arts to

denote quantity variables for specified stages or time periods typically using notation involving subscripts. For example, Ahmed on page 9 states: "Krarup [...] presented a formulation of (LSP) by defining Q_{tr} as the quantity produced in period t to satisfy the demand in period $r = t, \dots, T$." Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed/Bichler with those of Santos to model multi-stage and multi-item sales planning problems with variables denoting the quantities described in the limitation because this facilitates the formulation of an appropriate math program thus rendering it amenable to solution using various stochastic programming software packages.

Claim 18:

Ahmed also shows the limitations with respect to generating plans for *multiple products* in *multiple price classes* as per the rejections of the first limitations in claims 1, 15 and 20 above.

Ahmed further discloses and/or describes the following limitations.

- a *production constraint* (Ahmed on page 9 states: "Krarup [...] presented a formulation of (LSP) by defining Q_{tr} as the quantity produced in period t to satisfy the demand in period $r = t, \dots, T$." (emphasis added) hence corresponds to a *production constraint*.);
- a *demand constraint* (Ahmed on page 7 states: "Problem parameters α_i , β_i , h_i , and d_i represent the production cost, set-up cost, holding cost, and the demand in period t ." (emphasis added) where in the associated math program the demand is within a constraint equation, hence serves as a *demand constraint*.);

Ahmed does not specifically disclose and/or describe the following limitation, but Bichler, as shown, does.

- a *profit function that accounts for total revenue for each of multiple products, wherein the profit function comprises* (Bichler on page 290 column 1 states: "Revenue management originated in the airline industry as the practice of controlling the availability and/or pricing of travel seats in different booking classes, with the

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objective of maximizing revenue and/or profits." (emphasis added) where the 'objective' is an objective function that corresponds to a *profit function*.):

- *and a service level constraint* (Bichler, on page 300, column 1 specifically refers to a *service level*: "By standardizing the service classes (and possibly also the applications used by the premium service classes), the service provider may be able to develop robust statistical models for the bursting and thereby manage the capacity needed to meet the assured service levels." (emphasis added) where 'assured service levels' corresponds to a *service level constraint*.)

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Ahmed with those of Bichler to model multi-stage and multi-item sales planning problems with variables and constraints described in the limitations because this facilitates the formulation of an appropriate math program thus rendering it amenable to solution using various stochastic programming software packages.

Claim 19:

Ahmed/Bichler do not specifically disclose the following limitation, but Santos, as shown, does.

- *wherein the profit function further comprises an on-hand inventory constraint* (Santos, in at least [0062] states: "Gross profit is defined as follows: (revenue – inventory exposure - procurement investment + writeoff salvage value + ending inventory value of non - unique parts) + gross profit" (emphasis added) where 'inventory exposure' is an *on-hand inventory constraint*.).

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the quantity of invention to combine the teachings of Ahmed/Bichler with that of Santos and incorporate on-hand inventory levels into a profit function because they strongly affect profitability and are therefore essential elements of the aforementioned stochastic programming (SP) methodology, and that the capability existed at the time of the invention and the resulting improvements would have been predictable.

Conclusion

The prior art made of record and not relied upon that is considered pertinent to applicant's disclosure:

- Tanaka (US PgPub 20020065750 A1) and pertains to an "Order-acceptance management apparatus and method" which is analogous art to the instant application.

Any inquiry of a general nature or relating to the status of this application or concerning this communication or earlier communications from the Examiner should be directed to **Mark A. Fleischer** whose telephone number is **571.270.3925**. The Examiner can normally be reached on Monday-Friday, 9:30am-5:00pm. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, **Bradley Bayat** whose telephone number is **571.272.6704** may be contacted.

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Alexandria, VA 22314.

Mark A. Fleischer
/Mark A Fleischer/
Examiner, Art Unit 3624

20 July 2009

/Bradley B Bayat/
Supervisory Patent Examiner, Art Unit 3624